An Assessment of Impact of Some Demographic Variables on Traveling Behavior of Dhaka City Dwellers: An Application of Logistic Regression Model

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Abstract: *A logistic regression model has attempted for determining the potential determinants of traveling habit of Dhaka city dwellers. The regression parameters were estimated by Newton-Raphson iteration procedure. Occupation, Income, Age, Marital status, Sex, Family size and Education were found to have significant impact on traveling behavior.*

Some key words*: Logistic regression model, Newton-Raphson iteration procedure, Travelling behavior, Dichotomous variable.*

I. Introduction

Traveling becomes an admired propensity around the world. Today people travel during their leisure time outside their usual environment with intentions to return within a few days, weeks or months for vacation, business or other purposes. This traveling opens huge business opportunity which is known as tourism. Traveling behavior depends on so many factors like socio-economic characteristics, individual characteristics and so on. Having enourmous travel opportunities such as 'paid holiday' often helps to stimulate an individual to visit a destination. Travel management firms need to understand day-to-day, week-to-week and even season-to-season variability in activities – travel behavior over a span of time (Jones and Clarke, 1988; Huff and Hanson, 1986; Pas, 1987; Kitamura and van der Hoorn, 1987) in order to access the travel market. Therefore traveling havit of people becomes an importent area of study.

Travel and Tourism industry is one of the world's largest and fastest growing industries and it is considered vital to the world economy. The attention towards tourism in modern economies has increased because of its impact and influence on their growth (Brida, Lanzillotta, Lionetti and Risso, 2010). According to Veal (2003) tourism can be seen as a form of leisure that takes to places away from home. Vacation travel is one of the forms of this leisure out of home. But, out of home not necessarily refers to the open place to enjoy nature, but some sort of social and personal activities outside one's home. However, travel for non-leisure purposes is also often included in tourism, for example business and conference travel – but even these travelers generally make use of leisure facilities at their destination, often mixing business and pleasure. In this paper, purposes of traveling are ignored, moreover demographic characteristics of traveler are considered.

This study basically attempted to identify whether demographic characteristics like occupation, income, age, marital status, sex, family size and education of people living in Dhaka city have any influence on their traveling habit by using logistic regression model.

II. Objectives

The main objective of the paper is to examine the relationships between some selected demographic variables of people living in Dhaka city and their traveling habit regarding leisure. Besides, the study has attempted to show an application of logistic regression model in order to achieve the core objective. Finally, the paper contained some comments regarding people's traveling habit on their corresponding demographic characteristics.

III. Methodology

Quantitative approach is being used to conduct the research. In order to achieve the objectives of the study, a data set with 400 respondents has been collected from a research project financed by Bureau of Business Research, University of Dhaka. The dependent variable 'Traveling habit' was dichotomous in nature. And other seven demographic variables were measured by open ended questions and multiple choice questions. SPSS software has been used for conducting Bivariate analysis and Logistic Regression.

IV. Relevant Literature Review

Traveling habit depends on various variables of human life and their surrounding environment. This study attempted to assess some important literatures regarding individuals' travel habit and several of their demographic characteristics.

Traveling out of home for leisure or vacation is increasing (Jones Lang LaSalle, 2001). Fisk, 1959; Kelly and Godbey (1992); Weagley and Huh, (2004) observed that economic, social, political, and ecological factors shape the travel habit. The family, socialization process, education, cultures, etc. shapes the travel behavior of people especially in Bangladesh (Huda and Akhtar, 2006).

Research evidence has generally recognized these claims, socio-demographic variables have been considered quite usable as relevant determinants of tourist behavior, since they are easy to assess (Goodall and Ashworth, 1988; Lawson, 1995). Some demographic variables like age (Ghanbarian et. el., 2011), gender, employment, lifestyles, job status (Roberts, 2010), material status (Todd, 2005), family size (Honga et. al., 2008), social class (Warde et al., 1999), values by individual & country level (Verbakel, 2012), are determining factors of traveling habit of people.

Kelly (1996) claims that, financial resources are required to participate in leisure activities like traveling. Thompson and Tinsley (1979) examined the income elasticity for recreation expenditures and found per capita tourism expenditures to be positively related to income for all income classes. The resourceful class of the society has wider choices in this regard than their poor counterparts (Huda and Akhtar, 2006). According to Tae (2007), leisure activities that require a great deal of money are not popular among individuals of lower income. Assenting to what Rosma and Hoffman (1980) indicate the notion that the lower class was less interested to travel than the upper class because of cost.

White (1975) concludes that education is the most significant predictor of traveling habit. Kelly (1996) also claims that education influences leisure participation more than other factors, since individuals of higher education are more likely than individuals of lower education to pursue quality of life, colleagues or fellows ask to take part in tourism activities frequently. Lucas (1990) also argues that education influences outdoor wilderness visitation. Therefore, there is a positive relationship between education and participation in travel and tourism.

Nature of occupation has noteworthy contribution on traveling habit. Some jobs compel people to travel and some are not. Seemingly, busy persons would like to get more free time to relax and for resting (Huda and Akhtar, 2006). Students are a socio-demographic group in which rates of leisure interest, taste and skill formation are exceptionally high (Roberts, 2010).

Another issue is age of people and traveling habit. Gordon et al (1976) and Kelly (1980) indicates that the elderly are less likely to participate in tourism because they tend to avoid active leisure in the last phase of their life spans. Wearing (1999) also agrees that ageism may make the elderly less prone to participate in outdoor recreation due to lack of socialization and recreation skills. Nevertheless, Wearing (1999) and Floyd et al. (2006) argue that the leisure activities reduce ageism and advance older people's physical and mental health.

Legohérel (1998) found the opposite findings with regard to the high spending travellers by stating "the groups of three or more individuals that included children spent significantly less than childless couples". Moufakkir et al. (2004) examined visitors' spending in a gaming destination finding that "heavy spenders" were often travelling from outside of the state, and were younger, more affluent, and more likely to stay in hotels or motels.

Traveling has different meanings for women and for men (Kelly and Godbey, 1992) and they generalized the central role of gender in both predicting and explaining leisure behavior. Shaw (1985) observed that the distribution of traveling habit is significantly affected by gender whereas most of the cases women's travel was neglected (Henderson et al., 1988; Henderson and Bialeschki, 1991; Jackson and Searle, 1985; Shaw, 1994; Roberts, 2010).

Dardis et al. (1994) found that income, the number of adults, and education had significantly positive impacts on traveling habit. Weagley and Huh (2004) concluded that household income; age, education, race of the household head; and residential locations were relatively important factors affecting household expenditures on tour. Hammonds-Smith et al. (1992) found that, the higher the educational level, the more income older people spent on travel and tourism.

Education and income have been studied as predictors of leisure involvement (Gramann and Allison, 1999). According to Kelly (1996), education and income variables are significantly related to leisure involvement because they often directly contribute to participation opportunities and barriers. Dardis et al. (1981) found that recreation expenditures were positively related to income and education while negatively related to the age of the household head. And most of the cases consumer budgets of tour products depend on income, culture, habits, lifestyle etc. (Weagley and Huh, 2004).

In spite of having so many demographic factors to influence travel behavior, this study just pick several of them. This paper tried to examine the relationship between travelling behavior and some demographic variables like income; education; occupation; age; sex; family size; marital status.

V. Logistic Regression Model and Newton-Raphson Iteration Procedure:

Here, the data used is cross-sectional in nature and the dependent variable is dichotomous. The explanatory variables have been categorized into different groups. Therefore, logistic regression was applied to determine which factors best explain and predict travelling behavior of people. The logistic regression under cross-section setup is written as follows:

$$\Pr(y_i = 1|x_i) = \pi(x_i) = \frac{\exp(x_i^T \beta)}{1 + \exp(x_i^T \beta)}$$

where, y_i is the response of the ith individual, $x_i = (x_{i1}, \ldots, x_{ip})^T$ is the associated covariates vector, with $p = 13$.

The parameter estimates of $\beta = (\beta_1, \ldots, \beta_{13})'$ are obtained by maximum likelihood estimation approach using Newton-Raphson iteration procedure. In the mth iteration, the m.l.e of β will be

$$\hat{\beta}^{(m)} = \hat{\beta}^{(m-1)} + [I(\beta)]^{-1}|_{\beta = \hat{\beta}^{(m-1)}} U(\beta)|_{\beta = \hat{\beta}^{(m-1)}},$$

where U(β) is the score function, which is defined as

$$U(\beta) = \frac{\delta}{\delta \beta} \log L(\beta), \text{with } L(\beta) \text{being the likelihood function is defined as}$$

$$L(\beta) = \prod_{i=1}^{n} \pi_i(x_i)^{y_i} (1 - \pi_i(x_i))^{1-y_i}.$$

Again, I (β) is the information matrix, which is defined as

$$I(\beta) = -E\left[\frac{\delta}{\delta \beta'} U(\beta)\right].$$

VI. Outcomes of Bivariate analysis

At first, the study has conducted a bivariate analysis to examine the association between the selected covariates with the travelling behavior. Chi-square test is performed for testing significance of the association. Results of this analysis are given in *Table 1*. It is clear from Table 1 that travelling tendency is the highest for the people who are doing autonomous job and it is the lowest for the housewife and others. People, who are earning more than 50,000 taka, use to travel more than the other groups. Again people at the early stage (20-30 years) of their lives like long trips. Furthermore, unmarried person are more likely to travel than married person. Side by side, the table shows that male person feel more interest to have trip than their female counterpart. Again, families of large size (5-8 people) use to travel the least than the others. Lastly, it has been observed that the post-graduates are the most interested group for travelling.

Table 1: Examining the Association between Traveling Habit and Selected Variables

Explanatory variables	Category	Traveling habit		Total
		Yes	No	
[**]Occupation	Private	56(69.1%)	25(30.9%)	81
	Government and Semi-government	46(65.7%)	24(34.3%)	70
	Autonomous	22(73.3%)	8(26.7%)	30
	Business and Self-employed	49(67.1%)	24(32.9%)	73
	Student	54(71.1%)	22(28.9%)	76
	Housewife and Others	15(41.7%)	21(58.3%)	36
Income	10,000-30,000	77(61.1%)	49(38.9%)	126
	30,000-50,000	84(66.7%)	42(33.3%)	126
	Above 50,000	80(70.8%)	33(29.2%)	113
[**]Age	20-30	124(72.9%)	46(27.1%)	170
	30-50	100(61.7%)	62(38.3%)	162
	Above 50	18(52.9%)	16(47.1%)	34
[***]Marital Status	Unmarried	122(74.8%)	41(25.2%)	163
	Married	120(59.1%)	83(40.9%)	203
[*]Sex	Male	187(68.5%)	86(31.5%)	273
	Female	55(59.1%)	38(40.9%)	93
[**]Family size	2-4	118(72.0%)	46(28.0%)	164
	5-8	104(59.4%)	71(40.6%)	175
	More than 8	15(78.9%)	4(21.1%)	19
[***]Education	H.S.C or less	66(55.0%)	54(45.0%)	120
	Graduate	88(72.1%)	34(27.9%)	122
	Post graduate	88(72.7%)	33(27.3%)	121

[*]P<0.10; [**]p<0.05; [***]p<0.01

From the chi-square test result we have found that the variables Occupation, Age, Marital status, Sex, Family size and Education have significant effect in travelling. Thus, all the variables without Income have significant effect in travelling behavior.

VII. Outcomes of Logistic Regression

In logistic regression model, this study has included only those variables which have been found to be significant in bivariate analysis. As the variable Income has been found to be insignificant in the bivariate analysis, the variable has not been included in the logistic regression model. The estimates of logistic regression model parameters along with their Wald test results are given in Table 2.

Now from the ***Table 2***, we observe that people who are doing private job are more likely to take a long trip compared with those who are housewives or others. To be specific, the odds of travelling for the people who are doing private job are 3.136 times in a year the odds for those who are housewives or others. This result is highly significant (p<0.01). This may happen because of the fact that, housewives cannot manage enough money for travelling.

Older people are less likely to travel compared to younger people. Here we found that, people who are 30-50 years of old are less likely to travel than the people who are 20-30 years of old. More specifically the odds of travelling for the people who are 30-50 years of old are 0.598 times the odds for those who are 20-30 years of old. This is also true for the people who are more than 50 years. More specifically the odds of travelling for the people who are more than 50 years of old are 0.417 times the odds for those who are 20-30 years of old. Both the results are found to be statistically significant (p<0.05).

Marriage seems to be an important determinant of travelling. Here it is observed that, married person are less likely to travel than the unmarried person. The odds of travelling for the married person is 0.486 times the odds for those who are unmarried. This result is found to be highly significant (p<0.01).

Table 2: Logistic Regression Coefficient of Different Explanatory Variables for Traveling Behavior

Variable	$\hat{\beta}$	S.E.	Wald	P-value	Exp($\hat{\beta}$)
Occupation(Ref= Housewife and Others)					
[***]Private	1.143	0.415	7.589	0.006	3.136
[**]Government and Semi-government	0.987	0.422	5.483	0.019	2.683
[**]Autonomous	1.348	0.534	6.382	0.012	3.850
[**]Business and Self-employed	1.050	0.420	6.254	0.012	2.858
[***]Student	1.234	0.422	8.548	0.003	3.436
Age(Ref=20-30)					
[**]30-50	-0.514	0.237	4.716	0.030	0.598
[**]Above 50	-0.874	0.385	5.165	0.023	0.417
Marital status(Ref=Unmarried)					
[***]Married	-0.722	0.230	9.836	0.002	0.486
Sex(Ref=Female)					
[*]Male	0.407	0.248	2.695	0.101	1.502
Family size(Ref=2-4)					
[**]5-8	-0.560	0.232	5.824	0.016	0.571
More than 8	0.380	0.589	0.416	0.519	1.462
Education(Ref=Up to H.S.C)					
[***]Graduate	0.750	0.273	7.562	0.006	2.118
[***]Post graduate	0.780	0.274	8.079	0.004	2.182

[*]P<0.10; [**]p<0.05; [***]p<0.01

Male person are more likely to make a long trip than the female person. More specifically the odds of travelling for the male person is 1.502 times the odds for females. This result is also found to be significant (p<0.10). The data of the study shows people from large families are less likely to travel than the people from small families.

It is found from the result that graduates are more likely to travel than the people who have HSC level education and less. Besides, the study has provided similar result like graduates for the post graduates.

VIII. Concluding Remarks

Understanding traveling behavior of people with different demographic characteristics can provide leverage to travel marketers to make decision about their travel product and service design. By applying logistic regression model, this study has presented the empirical evidence of how the dependent variable (travelling habit) is being influenced by the demographic characteristics like occupation, income, age, marital status, sex, family size and education of people living in Dhaka city. Eventually, most of the independent variables have shown significant relationship on dependent variable.

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